L 5029-66 EWI(m) DIAAP

ACCESSION NR: AT5022316 UR/3138/64/000/314/0001/0012

AUTHOR: Kartashov, G. R.; Burgov, N. A.; Davydov, A. V.

TITLE: Investigation of a possible version of beta interactions in beta decay of Ne^{23}

SOURCE: USSR. Gosudarstvennyy komitet po ispol'zovaniyu atomnoy energii. Institut teoreticheskoy i eksperimental'noy fiziki. Doklady, no. 314, 1964. Issledovaniye varianta beta-vzaimodeystviya pri beta-raspade Ne^{23}, 1-12

TOPIC TAGS: beta decay, beta spectroscopy, neon

ABSTRACT: A possible case of beta interactions in beta decay of Ne^{23} was determined by means of experimental measurement of the cross-section of resonance absorption of gamma-rays as a function of the angle between the directions of electron and gamma-quantum emission. It is claimed that this method of determination was first proposed in 1957 by one of the authors (N. A. Burgov, ZhETF, 33, 655, 1957). Later this method was proposed independently by R. R. Lewis, R. B. Curtis (Phys. Rev. 110, 910, 1958) and by M. Morita and R. S. Morita (Phys. Rev. 111, 1130, 1958). The experiment involved the measurement of beta-gamma angular correlation function. The angular dependency is

Card 1/2

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ACCESSION NR: AT5022316

4

characterized by a correlation constant. A mathematical analysis of the correlation function and constants is given. The experimental device arrangement is described. It consisted of a toroidal ironless beta spectrometer, a system delivering Ne^{23} gas from reactor to spectrometer, gamma-counter, samples and computing devices. The measurement techniques are explained. A conclusion is drawn that the beta decay in question depends on an axial variant of beta interactions. The addition of tensor interaction is smaller than 20%. The authors express their gratitude to Yu. A. Nekrasov, B. M. Novikov, B. S. Gostev and V. G. Alpatov for their great assistance in carrying out extensive measurements. They belong to the staff of the Institute of Theoretical and Experimental Physics.

ASSOCIATION: none

SUBMITTED: 05Oct64 ENCL: 00 SUB CODE: NP

NO REF SOV: 004 OTHER: 005

Card 2/2

DAVYDOV, A. V.

Geography - Study and Teaching

Our geography room. Geog. v shkole No. 1, 1953.

Monthly List of Russian Accessions, Library of Congress, June 1953. Uncl.

DAVYDOV, Anatoliy Vasil'yevich; RODIONOVA, F.A., redaktor; RYBIN, I.V., tekhnicheskiy redaktor.

[Lessons in the geography room] Uroki v kabinete geografii. Moskva, Gos. uchebno-pedagog. izd-vo Ministerstva prosveshcheniia RSFSR, 1955. 67 p. (MLRA 9:4)
(Geography--Study and teaching)

DAVYDOV, A.V.

Tasks of school geography workshops. Vop.geog. no.37:81-88 '55.
(MLRA 8:12)
(Geography--Study and teaching) (Kolosovskii, Nikolai Nikolaevich, 1891-1954)

DEVYATOV, M.V., (shkola Kazani); NIKITIN, I.V.; GORSHENKOV, N.G.; RUTKOVSKIY, O.O. (Alma-Ata); DAVYDOV, A.V.; LEBEDEVA, G.P.

Letters to the editor. Geog. v shkole 21 no.5:72-75 S-O '58. (MIRA 11:10)

1. Shkola No.5 g.Solnechnogorska (for Nikitin). 2. Yakhromskaya shkola Moskovskoy oblasti (for Gorshenkov). 3. Vikulovskaya shkola Tyumenskoy oblasti (for Davydov). 4. Ul'yanovskaya shkola Kaluzhskoy oblasti (for Lebedeva).
(Geography--Study and teaching)

DAVYDOV, A. V.

Forest Management

Selecting trees for maintenance cuttings.

Les khoz. 5 no. 9, 1952

9. Monthly List of Russian Accessions, Library of Congress, November 1952 1953, Uncl.

1. DAVYDOV, A. V.

2. USSR (600)

4. Forests and Forestry - Congresses

7. Conference for cooperation between science and production. Les. khoz. 5, no. 10, 1952.

9. Monthly List of Russian Accessions, Library of Congress, January, 1953. Unclassified.

DAVYDOV, A. V.

DAVYDOV, A. V.: "The scientific principles and practice of cutting timber." Inst of Forestry, Acad Sci USSR. Leningrad, 1956. (DISSERTATION FOR THE DEGREE OF DOCTOR IN AGRICULTURAL SCIENCES).

So.: Knizhnaya Letopis', No. 25, 1956. Moscow

DAVYDOV, A.V.

It has found followers. Priroda 50 no.11:125 N '61. (MIRA 14:10)

1. Predsedatel' Buryatskogo sovnarkhoza, Ulan-Ude.
(Ulan-Ude--Landscape gardening)

DAVYDOV, A.V.

"Biology of trees and shrubs" by A.P.Shimaniuk. Reviewed by A.V.Davydov. Bot.zhur. 47 no.4:583-584 Ap '62. (MIRA 15:8)
(Trees) (Shrubs) (Shimaniuk, A.P.)

LUCHANSKIY, L.N.; DAVYDOV, A.V.; SHEYNFEL'D, B.Sh.

Using tall oil for the preparation of rosin-containing alkyd resins. Lakokras. mat. i ikh prim. no.6:75-77 '61. (MIRA 15:3)

1. L'vovskiy lakokrasochnyy zavod.
(Tall oil) (Gums and resins)

DAVYDOV, A.Y.; DAVYDOVA, R.Z.

Study of the temperature dependence of the adsorption and the exchange energy of silicic acid. Zhur.fiz.khim. 31 no.4:815-819 Ap '57. (MLRA 10:7)

1. Gosudarstvennyy universitet im. A.M.Gor'kogo i Sel'skokhozyaystvennyy institut im. V.V.Dokuchayeva, Khar'kov.
(Silicic acids) (Anions) (Adsorption)

DAVYDOV, B.

Variatsionnyi printsip i kanonicheskie uravneniia dlia ideal'noi zhidkosti. (Akademiia Nauk SSSR. Doklady. Novaia seriia, 1949, v.69, no.2p.165-168)

Title tr.: Variational principle and cononical equations for an ideal fluid. Reviewed by E. Leimanis in Mathematical Reviews, 1950, v.11, no.6, p.471.

AS2o2.83663 v.69

SO: Aeronautical science and Aviation in the Soviet Union. Library of Congress, 1955.

DAVYDOV, B.A.

Effect of mine working loads on the cost of coal mining in the Pechora Basin. Ugol' 39 no.6:53-55 Je '64 (MIRA 17:7)

1. Institut ekonomiki AN SSSR.

SERGIYENKO, S.R.; DELONE, I.O.; DAVYDOV, B.E.; TETERINA, M.P.

Composition andproperties of the bituminous portion of Nori petroleum. Report 1. Trudy Inst.nefti 4:18-30 '54. (MLRA 8:1)
(Nori--Bitumen)

DAVYDOV, B. E.

DAVYDOV, B. E. :"The dependence of the molecular-surface and polarization properties of the tarry substances in petroleum on their chemical nature." Moscow, 1955. Acad Sci USSR. Inst of Petroleum. (Dissertation for the Degree of Candidate of Chemical Sciences)

SO: Knizhnaya Letopis' No. 47, 19 November 1955. Moscow.

Davydov, B.E.

SERGIYENKO,S.R.; DELONE,I.O.; DAVYDOV,B.E.; TETERINA,M.P.

Analysis of the composition and properties of the part of petroleum having a high molecular weight. Trudy Inst.nefti no.6:71-78 '55.
(Petroleum--Analysis) (MLRA 8:12)

DAVYDOV, B. E.

USSR/Chemical Technology - Chemical Products and Their Application. Treatment of Natural Gases and Petroleum. Motor Fuels. Lubricants, I-13

Abst Journal: Referat Zhur - Khimiya, No 19, 1956, 62576

Author: Sergiyenko, S. R., Bedov, Yu. A., Teterina, M. P., Delone, I. O., Davydov, B. E.

Institution: None

Title: Use of the Adsorption Chromatography Method for the Separation and Investigation of Tarry Substances of Petroleum

Original Periodical: Tr. Komis. po analit. khimii AN SSSR, 1955, 6, 171-181

Abstract: A separation and investigation of the tarry substances of Georgian, Nebit dag, Tuymazin and Romashkin petroleum have been carried out. First by dilution with a 40-fold volume of pentane were separated the asphaltenes and the solution of tars and hydrocarbons was passed through the adsorbent. The best adsorbent was found to be ASK silica-gel of particle size 0.37-0.20 mm. Adsorbed tars were displaced

Card 1/2

USSR/Chemical Technology - Chemical Products and Their Application. Treatment of Natural Gases and Petroleum. Motor Fuels. Lubricants, I-13

Abst Journal: Referat Zhur - Khimiya, No 19, 1956, 62576

Abstract: successively with carbon tetrachloride, benzene, acetone and alcohol-benzene mixture (1:1). The tar fractions thus obtained were characterized according to elemental composition, molecular weight, iodine number, acidity and luminescence. For a more thorough separation of tar fractions they were separated by means of phenol. The investigations showed that tars of different petroleum differ appreciably from one another in quantitative ratios of the fractions as well as in properties and elemental composition of the latter. In the tars of all the investigated varieties of petroleum was observed a regular decrease in carbon content and increase in the content of hydrogen, oxygen and sulfur as well as of the C:H ratio on consecutive passing from first to last fraction. Regular changes were observed also in the other investigated properties of the fractions which indicate an appreciable difference between tar fractions. There are included color photographs of the luminescence of paper chromatographs of tar solutions and a detailed description is given of the luminescence picture.

Card 2/2

Davydov, B.E.

"914" Investigation of Properties of Macro-Molecular Compounds From Petroleum. Issledovanie svoistv vysokomolekullarnykh soedinenii nefti. (Russian.) S. R. Sergienko and B. E. Davydov. *Doklady akademii nauk SSSR*, v. 104, no. 4, Oct. 1, 1955, p. 555-558. 62

Study of mol.-surface properties and dielectric permeability of petroleum tars and their component parts in solutions of n-heptane, cyclohexane, and benzene. Tables, graphs. 9 ref.

(1)

DAVYDOV, B. E.

The composition and properties of high-molecular-weight fractions of petroleum. III. An investigation of the composition and properties of the resin fraction of Tuimazin (Devonian) crude oil. S. R. Sergienko, L. O. Dolgus, Yu. A. Pozov, B. E. Davydov, and M. P. Tetering. *Trudy Inst. Neft, Akad. Nauk S.S.S.R.* 8, 35–41(1959); cf. *C.A.* 49, 14312*f*; 50, 11651*f*.—The resins were sepd. by adsorption on SiO_2 gel and subsequent extn. with solvents of increasing polarities to give the following fractions: CCl_4 53.7, C_6H_6 33.0, Me_2CO 17.0, and alc.-benzene 3.4%. The percentage of asphaltenes and asphaltogenic acids increased from the 1st to the 4th fraction. The percentage of H, S, and O increased, while C decreased in the same order. The constituents of the phenol-sol. fraction obtained from

70% of the gas used in the process is supplied by the mixt. and appox. 30% by the ring of jets. Cf. *C.A.* 50, 2059*e*.
Harry Torkington

SERGIYENKO, S.R.; DELONE, I.O.; DAVYDOV, B.E.; TETERINA, M.P.

Composition and properties of petroleum high molecular weight compounds. Article 4: Study of the composition and properties of the tarry portion of Romashkinskiy (Devonian) petroleum. Trudy Inst.neft. 8:42-46 '56. (MLRA 9:10)

(Romashkinskiy--Petroleum--Analysis)
(High molecular weight compounds)

SERGIYENKO, S.R.; DELONE, I.O.; DAVYDOV, B.E.; TETERINA, M.P.

Composition and properties of petroleum high molecular weight compounds. Article 5: Study of the composition and properties of the tarry portion of Bavly (Devonian) petroleum. Trudy Inst. neft. 8:47-51 '56. (MLRA 9:10)

(Bavly--Petroleum--Analysis)
(High molecular weight compounds)

DAVYDOV, B. E.

USSR/Chemical Technology. Chemical Products and Their Application -- Treatment of natural gases and petroleum. Motor fuels. Lubricants, I-13

Abst Journal: Referat Zhur - Khimiya, No 2, 1957, 5527

Author: Sergiyenko, S. R., Delone, I. O., Davydov, B. E.

Institution: Academy of Sciences Azerbaydzhan SSR

Title: Removal of Tarry Substances From Diesel Fuels by the Method of Adsorption Chromatography

Original Publication: Tr. Vses. soveshch. po khimii i pererabotke nefti (18-24 sen. 1951). Baku, izd. AN AzSSR, 1953, 80-90

Abstract: No abstract

Card 1/1

DAVYDOV, B. E., SERGIYENKO, S. R.

"Physical Properties of Petroleum Resinous Substances" p. 245

Composition and Properties of the High Molecular Weight Fraction of Petroleum; Collection of Papers, Moscow, Izd-vo AN SSSR, 1958. 370pp. (Data nefti) 2nd Collection of papers publ. by AU Conference, Jan 56, Moscow.

Resinous substances from the Romashkino crude and from the Gyurgyany crude were taken for this study. The increase of the amount of acid and neutral saponifiable substances is directly proportional to the increase of the amount of heteroatoms they contain (O,S,N). All resinous substances are characterized by considerable surface activity. They can be separated into fractions of increasing surface activity with the aid of a series of solvents with increasing dielectric constants. The differentiation of resinous fractions can be improved by the inclusion of cyclohexane as a solvent. The molecular, surface, and polarization characteristics are used for the differentiation of fractions which show similar results in chemical analysis. There are 2 tables, 9 figures and 7 references of which 5 are Soviet and 2 English.

DAVYDOV, B.E.

5(3); 11(4) PHASE I BOOK EXPLOITATION SOV/2221

Akademiya nauk SSSR. Institut nefti

Trudy, t. 12 (Transactions of the Petroleum Institute, USSR. Academy of Sciences, Vol 12) Moscow, Izd-vo AN SSSR, 1958. 395 p. Errata slip inserted. 1,700 copies printed.

Ed.: S. R. Sergiyenko, Professor; Ed. of Publishing House: K. G. Miyesserov; Tech. Ed.: V. V. Golubeva.

PURPOSE: The book is intended for scientists, engineers, and technicians in the petroleum industry.

COVERAGE: This collection of articles describes the results of studies on the chemistry and technology of petroleum and gas conducted in the laboratories of the Petroleum Institute, Academy of Sciences, USSR, in 1956 and 1957. A new section "Petrochemical Synthesis and Technology of Petroleum" has been included in the collection of articles. A list of investigations published by the associates of the Institute in 1956 and 1957 and a list of dissertations for the Doctor's and Candidate's degrees presented in 1956 and 1957 at open sessions of the Academic Council of the Petroleum Institute, Academy of Sciences, USSR, are given.

17

DAVYDOV, B. E.

SOV/81-59-15-54820

Translation from: Referativnyy zhurnal. Khimiya, 1959, Nr 15, p 421 (USSR)

AUTHORS: Sergeyenko, S.R., Davydov, B.E.

TITLE: The Physical Properties of Resinous Substances of Petroleum

PERIODICAL: V sb.: Sostav i svoystva vysokomolekul. chasti nefti. Moscow, AN SSSR, 1956, pp 245 - 257

ABSTRACT: Resinous substances of Gyurgyan (low-sulfurous, low-resinous) and Romashkino (heavy, sulfurous) petroleum have been investigated by the earlier described method for the separation of resinous substances (RZhKhim, 1957, Nr 18, 61765). The physical-chemical characteristics are cited as well as the molecular-surface properties and the composition of the fractions obtained from both oils by the consecutive treatment with CCl_4, C_3H_8 and acetone. The properties of monomolecular layers of resins on the surface of water have been studied by the methods of measuring the horizontal pressure of the monolayer and the spreading of the drop. The dielectric permeability (DP) of the resins of the individual fractions and their solutions in n-heptane have been measured, and the curves of the dependence of DP on the frequency of the electric field, the concentration

Card 1/2

The Surface Properties of Resinous Substances of Petroleum

and the temperature of the solutions are given. The temperature dependence of the polarization of resins in the range of 7 - 65°C has been studied and the dipole moments of the investigated fractions have been determined. All investigated resins have a high surface activity. Petroleum resins can be separated into fractions with increasing surface activity by solvents with increasing DP. The regularities of the changes in molecular-surface and polarization properties of petroleum resins by fractions are caused by changes in the content of acidic and neutral saponifiable substances in the resins. All studied resins proved to be less surface-active in C_6H_6 solutions and considerably more active in solutions of cyclohexane and n-heptane; but the solvents could not change the principal tendency which depends on the chemical nature of the resin. Petroleum resins in concentrated solutions tend to association. The introduction of cyclohexane into the series of solvents which have been proposed earlier for the adsorption-chromatographic separation of resins permits to divide the resins into narrower fractions.

S. Rosenfel'd

SERGIYENKO, S.R.; SEMYACHKO, R.Ya.; DAVYDOV, B.E.

Studying the composition and properties of high-molecular-weight hydrocarbons and tars of Gyurgyanskiy petroleum. Article No.13. Trudy Inst.nefti 12:65-75, '58. (MIRA 12:3)
(Hydrocarbons--Analysis)

SERGIYENKO, S.R.; DAVYDOV, B.E.; LITMANOVICH, A.D.; SHAKHRAY, V.A.

Some physicochemical properties of petroleum asphaltenes and tars in solution. Article No.14. Trudy Inst.nefti 12:76-82 '58.
(MIRA 12:3)

(Tar) (Asphaltenes)

SERGIYENKO, S.R.; KORCHAGINA, V.I.; GALICH,P.N.; RUTMAN, L.I.; DAVYDOV, B.E.; KRASAVCHENKO, M.I.

Effect of the depth of sampling on the composition and properties of heavy residual stock. Article No.23. Trudy Inst.nefti 12:175-186 '58. (MIRA 12:3)

(Petroleum products--Analysis)

SERGIYENKO, S.R.; KORCHAGINA, V.I.; GALICH, P.N.; RUTMAN, L.I.; DAVYDOV, B.E.; KRASAVCHENKO, M.I.

Effect of the nature of feed stock and the duration of oxidation on the composition and properties of oxidized bitumens. Article No.24. Trudy Inst.nefti 12:187-199 '58. (MIRA 12:3)
(Bitumen) (Petroleum--Refining)

SERGIYENKO, Semen Romanovich. Prinimali uchastiye: SKLYAR, V.T.; GORDASH, YU.T.; MAYOROV, L.S.; ZHDANOVA, N.V.; DAVYDOV, B.E.; LEBEDEV, Ye.V.; TETERINA, M.P.; L'VOVA, L.A., vedushchiy red.; TROFIMOV, A.V., tekhn.red.

[High molecular weight compounds in petroleum] Vysokomolekuliarnye soedineniia nefti. Moskva, Gos.nauchno-tekhn.izd-vo neft. i gorno-toplivnoi lit-ry, 1959. 412 p. (MIRA 12:12)
(Petroleum--Analysis) (Macromolecular compounds)

5 (3)

AUTHORS: Topchiyev, A. V., Academician, Geyderikh, M. A., Davydov, B. E., Kargin, V. A., Academician, Krentsel', B. A., Kustanovich, I. M., Polak, L. S. SOV/20-128-2-25/59

TITLE: On the Possibility of Producing Polymeric Materials With Semiconductor Properties From Polyacrylnitrile

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 128, Nr 2, pp 312-315 (USSR)

ABSTRACT: It is difficult to produce organic substances with electronic conductivity since the admitted zones, if they develop at all, are narrow here, whereas the forbidden zones are very wide. This width is so considerable that no electron excitation is caused at temperatures at which the substance concerned is not yet decomposed. The semiconductor properties of the substances described in publications are usually connected with existing condensed aromatic rings and nitrogen atoms (Ref 1). Current carriers are bound to develop comparatively easily in polymers with double bonds, especially with conjugated double bonds, furthermore with atoms in the chain which have electrons on the outer levels that do not take part in the chemical bond (e.g. nitrogen atoms). The electron dispersion in the latter is bound to be low in the case of a sufficiently regular polymer

Card 1/3

structure. The necessary regularity degree can be approximately estimated from the length of the free path of the electron in the semiconductor, furthermore from the length of the C—C-bonds, the length of the monomeric member, and the length of the electron wave. It was found that one polymeric molecule is sufficient in the main chain of which exists no branching with more than 12 carbon atoms per 35 monomeric members. This holds in the case of a fiber with maximum elongation in which the polymeric molecules are arranged in the direction of the current. Then, no dispersion on the structural irregularities is to be expected. The production of polymers with such a degree of regularity is well possible today. An investigation of the products of thermal transformation of polyacrylnitrile is interesting from the above standpoint. The view of the transformations proceeding here is explained by a scheme. Table 1 gives the results of measurement of the paramagnetic electron resonance of the polymers at room temperature. The method and the device used for this purpose are described in reference 3. From the data given in table 1 it follows that: (1) the semiconductors obtained exhibit good electronic

conductivity ($\Delta g<0$). (2) The concentration of current carriers amounts to 10^{18} - 10^{19}, the degeneration is therefore inconsiderable. (3) The half-width of the spectra of the paramagnetic electron resonance characteristic of the relaxation duration amounts to 10-20 gauss. Figure 1 shows the dependence of electrical conductivity on temperature for polyacrylnitrile which was obtained by a redox initiation and subjected to thermal transformation. The materials produced on the basis of polyacrylnitrile have properties typical of semiconductors, and may be used at increased temperatures (Fig 1). The influence of a γ-radiation on the polymer renders the subsequent thermal treatment still more effective with respect to the production of semiconductors. There are 1 figure, 2 tables, and 5 references, 3 of which are Soviet.

SUBMITTED: July 16, 1959

Card 3/3

DAVYDOV, B.E.

PHASE I BOOK EXPLOITATION SOV/4984

International symposium on macromolecular chemistry. Moscow, 1960.

Mezhdunarodnyy simpozium po makromolekulyarnoy khimii SSSR, Moskva, 14-18 iyunya 1960 g.; doklady i avtoreferaty. Sektsiya III. (International Symposium on Macromolecular Chemistry Held in Moscow, June 14-18, 1960; Papers and Summaries) Section III. [Moscow, Izd-vo AN SSSR, 1960] 469 p. 55,000 copies printed.

Tech. Ed.: P. S. Kashina.

Sponsoring Agency: The International Union of Pure and Applied Chemistry. Commission on Macromolecular Chemistry.

PURPOSE: This book is intended for chemists interested in polymerization reactions and the synthesis of high molecular compounds.

COVERAGE: This is Section III of a multivolume work containing papers on macromolecular chemistry. The articles in general deal with the kinetics of polymerization reactions, the synthesis of special-purpose polymers, e.g., ion exchange resins, semiconductor materials, etc., methods of catalyzing polymerization reactions, properties and chemical interactions of high molecular materials, and the effects of various factors on polymerization and the degradation of high molecular compounds. No personalities are mentioned. References given follow the articles.

KARGIN, V.A., akademik; TOPCHIYEV, A.V., akademik; KRENTSEL', B.A., doktor khimicheskikh nauk; POLAK, L.S., doktor fiziko-matematicheskikh nauk; DAVYDOV, B.E., kand.khimicheskikh nauk

Semiconducting properties of polymer materials. Zhur. VKHO 5 no. 5:507-514 '60. (MIRA 13:12)
(Semiconductors) (Polymers)

DAVYDOV, B.E.

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S/063/60/005/003/003/021
A051/A029

AUTHORS: Kargin, V.A., Academician, Topchiyev, A.V., Academician, Krentsel', B.A., Doctor of Chemical Sciences, Zolak, L.S., Doctor of Physico-Mathematical Sciences, Davydov, B.E., Candidate of Chemical Sciences

TITLE: Semiconductor Properties of Polymer Materials

PERIODICAL: Zhurnal Vsesoyuznogo Khimicheskogo Obshchestva im. D.I. Mendeleyeva, 1960, No. 5, Vol. 5, pp. 507-514

TEXT: The authors deal with the problems of developing new classes of polymers with certain predetermined electrophysical properties necessary for industry, particularly semiconductivity. These problems have been one of the main subjects of scientific research in the physics and chemistry of polymers. An analysis of published works on the conductivity of low-molecular organic compounds has shown that their semiconductivity properties are connected with the π-electrons of the conjugated bonds in aliphatic chains

Card 1/3

S/063/60/005/005/003/021
A051/A029

Semiconductor Properties of Polymer Materials

or rings. "Metal-likeness" is said to be the result of a collection of the π-electrons in a conjugated system, and from this stand-point the polymer macromolecules with conjugated double bonds are of particular interest in the production of materials having special electrophysical properties, including that of semiconductivity. A list of available data is presented on ordinary semiconductors comparing them to the structures and chemical features of polymers. Semiconductors are characterized by the electrooonductivity values of 10^{-8}-10 $ohm^{-1} \cdot cm^{-1}$, increasing with an increase in temperature, and a concentration of the charge carriers of about 10^{10}-10^{21} electrons or electronic "holes" in a cm^3. It is pointed out that deviations from stoichiometry or any irregularity of the chain of the macromolecules' main valencies can have the same effect as admixtures in polymers on their semiconductivity properties. The distance between neighboring energy levels being about 10^{-22} ev, the sum total of these is regarded as a compact band about 1 ev wide and the energy value of the electron can be anywhere within this range. This band of energy states is called a zone. For all solid

Card 2/18

Semiconductor Properties of Polymer Materials

bodies, i.e., metals, semiconductors and dielectrics, the lower zone of electronic levels is the wide, so-called valency zone of the electrons fastened to certain atoms. A difference is noted between the listed three types of solid bodies when there is a shift to a higher energy level. Semiconductors having no additional levels in the forbidden zone are called semiconductors with self-conductivity. In the presence of an electrical field the free electrons and "holes" are the charge carriers. It is pointed out that real bodies always contain admixtures, creating admixture levels in the forbidden zone of the semiconductor located either closer to the upper or lower zone, in both cases causing the occurrence of additional admixture conductivity. The admixtures are called donor type in the first case and acceptor type in the second. It is assumed that any irregularity of the macromolecules usually creates acceptor admixtures. The mobility of the charge carriers is said to depend on the temperature and concentration of the admixtures and to decrease with an increase in the temperature and amount of admixture. Special interest is shown in the semiconductor type discovered by de Boer (Ref. 3), where part of the atoms of the lattice is replaced by atoms with almost the same size but a difference in valency. The method by which they are produced was developed for oxide semiconductors.

Card 3/18

S/065/60/005/005/003/021
A031/A029

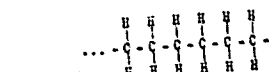
Semiconductor Properties of Polymer Materials

and consists in adding metals to the sample having a valency differing by a unit of 1 from the valency of the main metal. It is thought possible to form new synthetic polymers having semiconductor properties by a similar method of introducing metals into the chain of the macromolecule. Ordinary polymers have a certain amount of electroconductivity (Ref. 4,5), which depends on the temperature, and is expressed by $\sigma \sim \exp -\frac{E}{kT}$, where E is a certain activation energy, T the absolute temperature, k Boltzmann's constant. From this relationship the authors have attempted to solve the problem of establishing the connection between the polymer's structure and its electrophysical or electroconductivity properties. In solving this problem they based their analysis on the known aspects of the electroconductivity of low-molecular (including organic) compounds. This was followed by the determination of the characteristic features of the polymer structure. The problem of electroconductivity in organic polymers was divided into two parts: 1) the movement of electrons in the macromolecule, 2) transfer of electrons (or holes) from molecule to molecule. In the first part, an isolated linear macromolecule with the same bonds is analyzed:

Card 4/10

S/063/60/005/005/003/021
A051/A029

Semiconductor Properties of Polymer Materials



. The exact path followed by the potential of the electrical field formed by the electrons and nuclei of this type of system is not known, but the field changes periodically in space, and its period is determined by the periodicity of the molecular chain structure. An electron is theoretically placed into this field and its movement is regarded through the Schroedinger equation for an electron in a peridic field, the solution of which in this case is said to be the wave functions according to Block (Ref. 6): $\Psi = f_{x_1} e^{i \cdot h \cdot x}$, where $f_{x_1}(x)$ is a function depending on the wave number x_1, and is periodic relative to x_1 the magnitude of the period is determined by the structure of the molecule: by the length of the interatomic bonds, etc. This solution causes a zonal structure (Ref. 4,5). In calculating these fields the authors state that the theory of disturbance of quantum mechanics is used analyzing two extreme cases: a) a strong bond, b) a weak bond. It is pointed out that a real macromolecule can have conductivity if there are electrons in it whith sufficient probability of shift under the effect of an external electrical field with its component along

Card 5/18

S/063/60/005/005/003/021
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Semiconductor Properties of Polymer Materials

the molecular chain. The authors draw the conclusion that the probable necessary condition for the existence of electroconductivity in a macromolecule is the presence of multiple, particularly double bonds. It is considered advantageous to have a maximum number of multiple bonds, which can be accomplished in linear molecules and organic rings by alternating the single and double bonds (polyconjugation). The presence of a maximum number of multiple conjugated bonds in the macromolecule with a comparatively weak bond of the electrons to the atoms would facilitate the increase in electroconductivity. It is considered expedient to introduce atoms with a relatively weak bond of the electrons on the outer orbits, in order to decrease the width of the forbidden zone. The conductivity is further dependent on the migration of the double bonds and thus it is also expedient to increase the number of possible migrations of this kind, forming comple cyclic structures of conjugated bonds, (e.g., phthalocyanine and the metal compound type). In a molecule having quasi-free electrons the possibility of electronic and hole-type conductivity is present. The authors attempt to give a rough evaluation of the cases: Thus in the case of a double bond the π-electrons are less firmly attached to the corresponding atoms or group of atoms than

the π-electrons and more mobile, and thanks to the quantum tunnel effect can overcome the barrier U(r) and move to a neighboring bond with a probability p (relative to a unit of time)

$\frac{1}{\tau} \sim p \approx \frac{V}{L} \exp\left\{-\frac{2}{\hbar}\int_{r_1}^{r_2}\sqrt{2m[U(r)-\epsilon]}\,dr\right\}$ (A), where τ is the life-span of the electron on a separate bond, $\hbar = \frac{h}{2\pi}$, L is the width of the potential depression, where the electronn are located, m is the electron mass, V is its velocity, ϵ is the kinetic energy. The complex function U(r) is replaced for simplicity by a rectangular potential barrier (Fig. 1), then L is determined by the length of the double bond C-C, U_o is determined by the dimensions of the atom C, $U_o - \epsilon$ by the potential energy of the most weakly bonded electron. Then equation (A) becomes:

$\tau \approx \frac{1}{V} \exp\left\{-\frac{2}{\hbar} L_o \sqrt{2m(U_o - \epsilon)}\right\}$. At $L = 1 \cdot 10^{-8}$, $U_o - \epsilon = 10$ ev $= 10^{-8}$ cm/sec, we obtain $\tau = 10^{-15}$ sec. Thus during the time of the electron being locat-

Semiconductor Properties of Polymer Materials

ed on one bond about 10^{-15} it shifts over at a rate of $v_{shift} = \frac{Q^{-8}}{Q^{-15}} = 10^7$ cm/ sec. The given formulas show that due to the strong dependence of τ on U_0 and $U_{max.} - \mathcal{E}$, the electrons of the internal orbits forming the polymer molecule, which have a greater bond energy, will be almost completely localized and will not be able to participate in the electroconductivity of the macromolecule. It is stressed that the problem of the transfer of the charge carriers (electrons and holes) from molecule to molecule is a difficult one. It is assumed that the mobility of the charge carriers can be mainly determined by the probability of the tunnel gap through the intramolecular barrier and that high temperatures are necessary so that the electrons can overcome these gaps between the macromolecules. The electroconductivity of the polymer semiconductor will depend only on the concentration of the charge carriers in the first approximation (at a given structure of the polymer). The importance of the intramolecular transfers is stressed on the example of the benzene molecule, which is an excellent conductor, but liquid benzene (a group of these molecules) is an excellent insulator. The actual potential barrier between the macromolecules depends on these conditions, i.e., on the distance between the macromolecules and their number in a unit volume. The

Card 8/18

Card 10/19

chemical bonds between the molecules and their space orientation will also become relevant factors in future. The optimum conditions for the formation and movement of charge carriers in the macromolecule is partly determined by the formation of the polymer molecule with polyconjugated and aromatic rings in the chain, but the latter do not solve completely the problems of easing the intramolecular barrier for them. Further mention is made of the significant effect of orientation on the electroconductivity of the polymer. The orientation of the polymer molecule also causes severe anisotropy of its properties along and across the axis of orientation. As regards the electroconductivity, it is assumed that orientation can lead to two results: an increase in the number of charge carriers passing in a unit of time through a certain transverse cross-section of the polymer semiconductor, and the occurrence of severe anisotropy of the conductivity. In a polymer with regularly-built chains the conductivity is present only in the chain molecules. It is suggested that the conducting elements can be simply arranged parallel to each other, and thus create a system with good conductivity along the orientation axis and a slight conductivity in the perpendicular direction. The most expedient conditions are a high degree of regularity and few transverses bonds since the latter would form the most perfected orientation of the polymer thread. This type of polymer system should have the best conductivity along

Card 9/18

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A051/A029

Semiconductor Properties of Polymer Materials

the orientation axis and the highest anisotropy of the conductivity. The authors diucuss the paramagnetic properties of semiconductors, particularly occurring in their spectra of electronic paramagnetic resonance (EPR). Since the integral EPR spectrum is connected with the number of electrons present having non-paired spins in the investigated system, it is assumed that the π-cloud is characterized by a certain non-pairing. The number of particles with non-paired spins corresponding to the narrow signal in the EPR spectrum of the polymer is about 10^{18}-10^{19} in one cm^3. But these cannot be considered charge carriers in polymers with semiconductor properties for the following reasons: the electroconductivity increases with the temperature and the concentration of these particles determined by the area of the narrow line mentioned in the EPR spectrum drops. It is assumed that the second wide signal might be connected with the electroconductivity. The EPR spectrum is considered a property of the molecule and not of the polymer on the whole. The signal in the EPR spectrum indicates the fulfillment of an important, although not the only, condition for the polymer (especially synthesized or processed), to possess semiconductor properties. The presence of a system of conjugated double bonds is considered important but not adequate for the formation of a polymer material, which would completely be conducting, particu-

Card 10/18

Semiconductor Properties of Polymer Materials

larly semiconducting. The authors claim that it is possible to produce polymers with a system of conjugated bonds in the main chain in two ways: 1) by transformation of the macromolecules in the chain of already known polymers, 2) by special construction (synthesis) of the macromolecules with a system of conjugated bonds. Some of the specific work done on the synthesizing of polymer molecules with a system of conjugated bonds is gone into, particularly that of the products of thermal transformation of polyacrylonitrile. It is thought that interesting prospects lie in the production of this polymer substance characterized by a complex of electrophysical properties, viz., semiconductivity. It is assumed that in the thermal transformation the polyacrylonitrile undergoes chemical changes leading to the formation of a polymer, the macromolecules of which consist of cyclic chains. The given reaction schemes show that in this type of polymer semiconductivity properties can be expected. This corresponds to the theory developed by Semenov (Ref. 7) in analyzing the EPR spectra of certain polymer molecules, especially that of polyaminoquinone. When elevating the temperature of processing the polyacrylonitrile, the narrow signal of the EPR mentioned above increases (Fig. 3) almostly linearly in the temperature range of 325-600°C. Similar data were previously obtained in the thermal processing of polyvinylchloride (Ref. 10). The authors feel partially justified in assuming that in order to produce

Card 11/18

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A051/A029

Semiconductor Properties of Polymer Materials

satisfactory semiconductor properties, a strict regularity of the structure of the polymer chains is needed. It is also assumed that polyacrylonitrile forms such regular chains. Special interest is felt in orientation as a means for increasing the regularity of the structure of polymers amongst other possibilities. The authors specify that at the present time several new polymer materials, the macromolecules of which have a system of conjugated double bonds, have been produced both in the USSR and abroad. These polymers have interesting magnetic properties. In this connection the work of Berlin (Ref. 15) is noted in the synthesis of polyaminoquinones. In the interaction of chloranil with benzidine polymers were obtained of the given structure. The authors of this synthesis assume that in this case there are not only intermolecular hydrogen bonds, but also bonds of the intrachain type, which can lead to spatial structuralizing and impairment of the solubility. Reference is also made to polymer-chelate complexes of percyanoethylene with metals (Ref. 21) stating that these compounds have a high thermal stability, a high magnetic susceptibility, a low activation energy, (0.26) and σ about 10^{-2} $ohm^{-1} \cdot cm^{-1}$ at 20°C. Special attention is further paid to the products synthesized by the authors (Ref. 16) of semi-condensation of phthalic anhydride with n-phenylenediamine and hydroquinone. The latter are

Card 12/18

Semiconductor Properties of Polymer Materials

characterized by an electroconductivity of $7 \cdot 10^{-7}$ ohm^{-1}·cm^{-1} with an activation energy of about 0.6 ev. Roginskiy (Ref. 18) mentioned the interesting possibilities of using the semiconducting properties of certain organic polymers as heterogenic catalysts. Semenov (Ref. 20) studied this matter further. In conclusion the authors point out that the future profound investigation of the properties of polymer materials with a system of conjugated bonds, especially those with obvious semiconducting properties, will lead to new possibilities of creating heterogeneous catalysts with a high selectivity. There are 2 figures, 1 table, 5 structural formulae, 1 diagram, 5 equations and 21 references: 14 are Soviet, 6 English, 1 Belgian.

Card 13/18

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S/020/61/137/004/025/031
B101/B208

AUTHORS: Dokukina, Ye.S., Roginskiy, S.Z., Corresponding Member AS USSR, Sakharov, M.M., Topchiyev, A.V., Academician, Geyderikh, M.A., Davydov, B.E., and Krentsel', B.A.

TITLE: Catalysis on organic semiconductors obtained by heat treatment of polyacrylonitrile

PERIODICAL: Doklady Akademii nauk SSSR, v. 137, no. 4, 1961, 893- 895

TEXT: It could be assumed on the basis of the bibliography and the generally accepted concept of the catalytic mechanism that organic semiconductors with small forbidden band width and considerable electrical conductivity at room temperature should be active catalysts in redox reactions. Only qualitative data being available so far, it was the purpose of this study to investigate the catalytic activity of polymer semiconductors containing a system of conjugate bonds on redox reactions in the gaseous and vapor phases. The authors have chosen semiconductors from polyacrylonitrile (PAN). Data on preparation and electrical properties of this material are given in Ref. 7 (A.V. Topchiyev, M.A. Geyderikh et al.,

Card 1/5

3

21503 S/020/61/137/004/025/031
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DAN, 128, 312 (1959)), and have been reported by M.A. Geyderikh at the International Symposium on Macromolecular Chemistry on June 14 - 18, 1960. Two PAN samples were used: PAN-1 to which 0.01% $CuCl_2$ was added prior to heat treatment, and which had a specific surface of 0.06 m^2/g (determined by means of krypton), and PAN-2 without copper admixture and with a specific surface of 0.04 m^2/g. Catalytic activity was studied in an apparatus similar to that of O.M. Schwab, N. Theophilides (Ref. 13, see below). The catalysts were annealed at 450°C for 1-3 hr prior to the experiment. Considerable catalytic activity was only observed in the decomposition of formic acid. Experimental data are given in Table 1. The copper admixture was found to be of minor importance. As the change of the decomposition rate v of HCOOH was determined by the continuous method on a stepwise rise of temperature, a constant rate of acid addition, and a low degree of conversion (1 - 10%), the activation energy could be calculated from log v = - f(1/T). It was 21 kcal for PAN-1, and 25 kcal for PAN-2. The catalytic activity of the samples increased from experiment to experiment until it reached a constant value. Activation energy, however, remained nearly constant. A catalytic action of PAN on the decomposition of hydrazine hydrate

in NH_3 and N_2 was observed only at high temperatures (250°C) at which the reaction on the glass surface of the vessel and homogeneous decomposition play an important role. The specific activity of PAN with respect to the decomposition of HCOOH is explained by its chemical structure. The N-atoms in the chain of the conjugate bonds are assumed to act as adsorption centers for the acid molecules. By changing the chemical and electrophysical properties of polymers with conjugate double bonds, highly selective catalysts should be obtained which are comparable to those used in fermentative catalysis. This is the reproduction of a report delivered by S.Z. Roginskiy, Corresponding Member AN USSR, before the Uchenyy Sovet Instituta khimicheskoy fiziki Akademii nauk SSSR (Scientific Council of the Institute of Chemical Physics of the Academy of Sciences USSR) on May 27, 1960. Mention is made of A.A. Berlin, L.A. Blyumenfel'd, N.N. Semenov. (Ref. 11: Izv. AN SSSR, OKhN, 1959, no. 9, 1689). There are 1 figure, 2 tables, and 14 references: 8 Soviet-bloc and 6 non-Soviet-bloc. The 3 references to English language publications read as follows: K. Tamaru, T. Shimada, Bull. Chem. Soc. Japan, 31, 141, (1958); D.D. Eley, Res. appl. Ind. 12, 293 (1959); G.M. Schwab, H.

Card 3/5

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S/020/61/137/004/025/031
B101/B208

Catalysis on organic...

Theophilides, J. phys. Chem., 50, 427 (1946).

ASSOCIATION: Institut fizicheskoy khimii Akademii nauk SSSR (Institute of Physical Chemistry, Academy of Sciences USSR), Institut neftekhimicheskogo sinteza Akademii nauk SSSR (Institute of Petrochemical Synthesis of the Academy of Sciences USSR)

SUBMITTED: December 24, 1960

Card 1/3

AYRAPETYANTS, A.V.; VOYTENKO, R.M.; DAVYDOV, B.E.; SEREBRYANIKOV, V.S.

On the so-called "compensation effect" in organic semiconductors.
Vysokom.soed. 3 no.12:1876 D '61. (MIRA 15:3)
(Semiconductors)

TOPCHIYEV, A.V., akademik; KORSHAK, Yu.V.; DAVYDOV, B.E.; KRENTSEL', B.A.

Polyazines, a new class of polymers with conjugate bonds. Dokl. AN SSSR 147 no.3:645-648 N '62. (MIRA 15:12)

1. Institut neftekhimicheskogo sinteza AN SSSR.
(Amines) (Polymers) (Conjugation (Chemistry))

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S/844/62/000/000/105/129
D204/D307

AUTHORS: Gulyayev, G. V., Davydov, B. E., Krentsel', B. A., Patalakh, I. I. and Polak L. S.

TITLE: The effect of radiation on semiconducting polymeric materials

SOURCE: Trudy II Vsesoyuznogo soveshchaniya po radiatsionnoy khimii. Ed. by L. S. Polak. Moscow, Izd-vo AN SSSR, 1962, 621-624

TEXT: The effects of γ and electron irradiation on polymers based on polyacrylonitrile (PAN) were studied, to determine the nature of such materials. The (powdered) specimens were prepared by catalytic or radiational polymerization; a polyacrylonitrile fabric was also tested. The specific electron conductance (σ, 10^{-10} ohms^{-1}.cm^{-1}) of hot-pressed (15,000 atm, 350°C) radiation polymerized PAN was lower than that of catalytically polymerized PAN (~2.6 - 3.6) and decreased, by a factor of 10 - 15, with increasing power of the dose used to induce polymerization (10^6 r, the rates were varied from 28

Card 1/2

The effect of radiation ...

to 140 r/sec.cm^3, at 25°C). The σ of catalytic PAN polymerized at 28 r/sec.cm^3, increased on irradiation with increasing doses, up to ~10 and ~5 respectively at 5 Mr; further increase was only slight. The σ of PAN polymerized at 75 and at 140 r/sec.cm^3 was unaffected by irradiation. The energy of activation (= 0.4 ev) remained constant in all cases. The specific conductance of PAN fabric increased on irradiation, from ~10^{-5} at 0 to ~10^{-3} ohm^{-1}cm^{-1} at 140 Mr, whilst the energy of activation fell from 0.33 to 0.2 ev. Similar effects were observed by subjecting the fabric to 0.7 Mev electrons. The various changes observed in these semiconducting polymers on irradiation are ascribed to differences in the macrostructure of the polymer. There are 4 figures.

ASSOCIATION: Institut neftekhimicheskogo sinteza AN SSSR (Institute of Petrochemical Synthesis, AS USSR)

Card 2/2

STIL'BANS, L.S., doktor fiz.-mat. nauk; ROZENSHTEYN, L.D., kand. fiz.-mat. nauk; AYRAPETYANTS, A.V., kand. fiz.-mat. nauk; KARGIN, V.A., akademik; KRENTSEL', B.A., doktor khim. nauk; TOPCHIYEV, A.V., akademik [deceased]; DAVYDOV, B.E., kandid.khim. nauk; GEVSEN, L.V., red.; MIYESSEROV, K.G., red.; GOLUB', S.P., tekhn. red.

[Organic semiconductors] Organicheskie poluprovodniki. Moskva, Izd-vo AN SSSR, 1963. 317 p. (MIRA 16:12)

1. Akademiya nauk SSSR. Institut neftekhimicheskogo sinteza. (Semiconductors)

AYRAPETYANTS, A.V., VOYTENKO, R.M., DAVYDOV, B.E. KRENTSEL, B.A.

Conductance mechanism in organic semi-conductor polymers

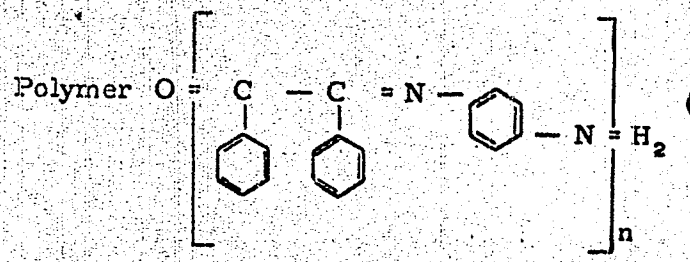
Report submitted for the International Symposium of Macromolecular chemistry
Paris, 1.6 July 63

DAVYDOV, B.E.

AID Nr. 992-9 18 June

ELECTROPHYSICAL PROPERTIES OF POLYMERIC SCHIFF BASES OF BENZIL AND P-PHENYLENEDIAMINE (USSR)

Davydov, B. E., Yu. A. Popov, L. V. Prokof'yeva, and L. D. Rozenshtyn. IN: Akademiya nauk SSSR, Izvestiya. Otdeleniye khimicheskikh nauk, no. 4, Apr 1963, 759-761. S/062/63/000/004/017/022



(I),

representative of a new class of organic semiconductors -- Schiff bases with a conjugated bond system -- has been synthesized, and its electric conduction and photoconduction have been studied at the Institute of Petrochemical

Card 1/3

ELECTROPHYSICAL PROPERTIES [Cont'd] S/062/63/000/004/017/022

Synthesis and the Institute of Semiconductors, both Academy of Sciences USSR. Polymer I, prepared by bulk polycondensation of benzil with p-phenylenediamine at 250°C in an inert atmosphere, is dark brown and is soluble in dimethylformamide, phenol, and formic, acetic, and phosphoric acids. X-ray analysis showed it to have a crystalline structure. Its molecular weight is 900, corresponding to n = 3 or 4. The electric conductivity of molded specimens of I was measured in a vacuum (10^{-4} mm Hg). The temperature dependence of conductivity obeyed the exponential law. The energy of activation of conductivity ε_T and the preexponential factor σ_0 were found to be ε_T = 1.08 ev, $\sigma_0 = 8.5 \cdot 10^{-4}$ ohm^{-1}·cm^{-1} in the 90 to 115°C range and 0.45 ev, $4.0 \cdot 10^{-8}$ ohm^{-1}·cm^{-1} in the 60 to 90°C range; conductivity at 20°C was $\sigma_{20} = 5 \cdot 10^{-12}$ ohm^{-1}·cm^{-1}. The photoconduction of thin films of I, deposited from dimethylformamide at 10^{-5} to 10^{-4} mm Hg onto quartz plates

ELECTROPHYSICAL PROPERTIES [Cont'd] S/062/63/000/004/017/022

with platinum electrodes separated by a 1-mm gap, was induced by irradiation with white light. The photocurrent of I at 1000 to 1500 v/cm obeyed Ohm's law. The lux-ampere characteristic was described by $i = L^n$, where n was 0.5 to 0.6 in the experiment. The photocurrent was exponentially dependent on temperature: $i = e^{-\varepsilon_{ph}/kT}$, where ε_{ph}, the thermal energy of photocurrent activation, was 0.19 ev. The ε_{ph} was determined from reversible measurements in the 20 to 75°C range. Thus, the photoelectric properties of I were similar to those of previously studied organic semiconductors. However, the photocurrent kinetics of I was characterized by pronounced polarization phenomena. [NI]

Card 3/3

DAVYDOV, B. E.

AID Nr. 972-34 21 May

NEW POLYMERIC SCHIFF BASES AND THEIR ELECTROPHYSICAL PROPERTIES (USSR)

Davydov, B. E., B. A. Krentsel', Yu. A. Popov, and L. V. Prokof'yeva. Vysokomolekulyarnyye soyedineniya, v. 5, no. 3, Mar 1963, 321-324.
S/190/63/005/003/004/024

New polymeric Schiff bases with conjugated bonds and with a hetero atom in the backbone have been synthesized by polycondensation of p-phenylenediamine (PPDA) with 2,3-butanedione (I), terephthalaldehyde (II), or glyoxal (III). The polycondensation products of PPDA and I (polymer II-1), II (II-2), or III (II-3) are black, brown, or yellow powders, respectively. All three are soluble in sulfuric acid, and II-1 and II-2, in formic and phosphoric acids also. IR spectra indicate =C-C= bonds and a 1,4-substituted benzene ring in II-1 and II-3 and a methyl radical in II-1. X-ray analysis shows that II-1 and II-2 have a crystalline structure and that II-3 is amorphous. II-3 emits a single, narrow EPR signal indicating the delocalization of electrons in the system of

Card 1/2

NEW POLYMERIC SCHIFF BASES [Cont'd] S/190/63/005/003/004/024

conjugated bonds; П-1 and П-2 emit no EPR signals. Heat treatment of П-1, П-2, and П-3 for 4 hrs resulted in the following losses in weight: at 250°C, 12.87, 3.56, and 20.9%; and at 300°C, 17.20, 5.16, and 27.40%, respectively. Heat-treated П-1 and П-2 emit a single, narrow EPR signal, probably because of further polycondensation, which results in a longer polyconjugation chain. The electrical conductivity (σ) of the synthesized substances is related to temperature by

$$\sigma = \sigma_0 e^{-\Delta E/2kT}.$$

σ_0 varied from $1.8 \cdot 10^{5}$ ohm^{-1}·cm^{-1} for П-2 to $3.2 \cdot 10^{-4}$ ohm^{-1}·cm^{-1} for thermally treated П-3; σ_{20} varied from $2.5 \cdot 10^{-11}$ ohm^{-1}·cm^{-1} for thermally treated П-3 to $1.1 \cdot 10^{-18}$ ohm^{-1}·cm^{-1} for П-1. The study was carried out at the Institute of Petrochemical Synthesis, Academy of Sciences USSR. [BA0]

DAVYDOV, B.E.; DRABKIN, I.A.; KORSHAK, Yu.V.; ROZENSHTEYN, L.D.

Electrophysical properties of polyazines. Izv. AN SSSR. Ser.khim. no.9:1664-1667 S '63. (MIRA 16:9)

1. Institut neftekhimicheskogo sinteza AN SSSR i Institut poluprovodnikov AN SSSR.
(Azines) (Polymers--Electric properties)

POPOV, Yu.A.; DAVYDOV, B.E.; SHISHKINA, M.V.; KRENTSEL', B.A.

Thermal conversions of polymeric Schiff bases. Izv. AN SSSR. Ser. khim. no.11:2014-2019 N '63. (MIRA 17:1)

1. Institut neftekhimicheskogo sinteza AN SSSR.

AYRAPETYANTS, A.V.; VOYTENKO, R.M.; DAVYDOV, B.E.; KRENTSEL', B.A.

Electric conductance mechanism in organic semiconductor polymers. Dokl. AN SSSR 148 no.3:605-608 Ja '63. (MIRA 16:2)

1. Institut neftekhimicheskogo sinteza AN SSSR i Institut poluprovodnikov AN SSSR. Predstavleno akademikom V.A. Karginym.
(Polymers—Electric properties) (Semiconductors)

ACCESSION NR: AP4042880 S/0062/64/000/007/1328/1330

AUTHOR: Ayrapetyants, A. V.; Vlasova, R. M.; Geyderikh, M. A.; Davy*dov, B. E.

TITLE: Study of the electric properties of polyacrylonitrile during heat treatment

SOURCE: AN SSSR. Izvestiya. Seriya khimicheskaya, no. 7, 1964, 1328-1330

TOPIC TAGS: polyacrylonitrile, polyacrylonitrile heat treatment, polyacrylonitrile pyrolysis, polyacrylonitrile electric properties, polyacrylonitrile electric conductivity, ionic conductivity component, electronic conductivity component, carrier, carrier effective mobility, carrier concentration

ABSTRACT: Changes in the electric properties of polyacrylonitrile during heat treatment at 100—145C have been studied by determining the changes in conductivity and thermoelectric force. In addition, in the course of the pyrolysis IR spectra were studied, and the thermal degradation of the polymer was evaluated by weight loss. The results

Card 1/2

ACCESSION NR: AP4042880

indicate that the electric conductivity of the products of the thermal conversion of polyacrylonitrile consist of an ionic and an electronic component. The ionic component, which causes the conductivity of the initial polymer, prevails in specimens treated at 150—300C; it decreases with an increase in the temperature of the heat treatment. The electronic component increases with an increase in the heat-treatment temperature, owing to an increase in the number of conjugate double bonds. The conductivity increases during the heat treatment at 400C; this increase is due to an increase of the effective mobility of carriers rather than to an increase in their concentration. Orig. art. has: 3 figures and 1 table.

ASSOCIATION: Institut poluprovodnikov AN SSSR (Institute of Semiconductors AN SSSR); Institut neftekhimicheskogo sinteza im. A. V. Topchiyev AN SSSR (Institute of Petrochemical Synthesis AN SSSR)

SUBMITTED: 20Dec63 ATD PRESS: 3066 ENCL: 00

SUB CODE: OC, EM NO REF SOV: 005 OTHER: 000

Card 2/2

L 16034-65 EWT(m)/EPF(c)/EWP(j)/T Pc-4/Pr-4 AFWL/SSD/ASD(m)-3/AS(MD)-2/AFETR/
ACCESSION NR: AP4045800 RAEM(a)/ESD(t)/RAEM(c) RM S/0062/64/000/009/1697/1700

AUTHORS: Nasirov, F.M.; Karpacheva, G.P.; Davy*dov, B.E.; Krentsel', B.A.

TITLE: Structure of the soluble complex organometallic catalyst for acetylene polymerization

SOURCE: AN SSSR. Izv. Seriya khimicheskaya, no. 9, 1964, 1697-1700

TOPIC TAGS: acetylene polymerization catalyst, complex organometallic catalyst, structure, chemical behavior, triethylaluminum, vanadium acetylacetonate, triethylaluminum vanadium acetylacetonate catalyst, tetravalent vanadium, divalent vanadium, magnetic susceptibility, EPR spectrum, magnetic moment, g-factor

ABSTRACT: The structure and the chemical nature of the active centers of the acetylene polymerization catalyst complex formed by reaction of triethylaluminum with vanadium acetylacetonate were examined. The catalyst, prepared by mixing $VC_{10}H_{14}O_5$ with a fourfold excess of $Al(C_2H_5)_3$ in benzene at room temperature, appeared homogeneous. It was proposed that the formation of the active catalytic complex took place according to the reaction shown in the

Card 1/3

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ACCESSION NR: AP4045800

enclosure in which the tetravalent vanadium was reduced to the divalent. The magnetic susceptibility and the EPR spectra of the vanadium acetylacetonate and of the complex were examined. The magnetic moment for $VC_{10}H_{14}O_5$, determined from the reverse molar magnetic susceptibility-temperature (120-300K range) relationship, was 1.67 ; for the complex, 3.83 . Similar values for magnetic moment were calculated from g-factors obtained from EPR spectral date, confirming divalency of the vanadium in the complex. Orig. art. has: 3 figures and 2 equations.

ASSOCIATION: Institut neftekhimicheskogo sinteza im. A.V. Topchiyeva Akademii nauk SSSR (Institute of Petrochemical Synthesis Academy of Sciences SSSR)

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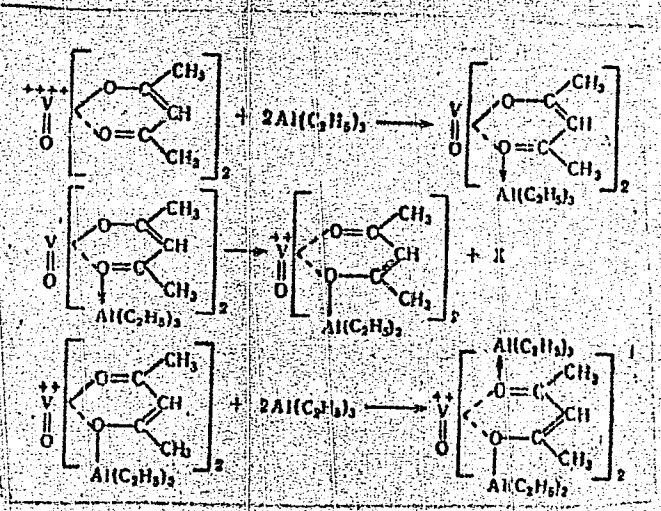
Card 2/3

ACCESSION NR: AP4045800

ENCLOSURE: 01



Card 3/3

ACCESSION NR: AP4009151 S/0190/64/006/001/0086/0088

AUTHORS: Ayrapetyants, A. V.; Voytenko, R. M.; Davy*dov, B. E.; Krentsel', B. A.; Serebryanikov, V. S.

TITLE: Effect of orientation on electrical properties of thermally treated polyacrylonitrile

SOURCE: Vy*sokomolekulyarny*ye soyedineniya, v. 6, no. 1, 1964, 86-88 and top half of insert between p. 86 & 87

TOPIC TAGS: polyacrylonitrile, fiber orientation, conductivity, activation energy, current carrier

ABSTRACT: The effect of thermally treated fiber orientation on the electrical properties of polyacrylonitrile has been investigated and data recorded as x-ray photographs. The specific resistance was measured by sounding probe techniques for these specimens which were heat-treated at 510, 620, and 700C respectively. The conditions of thermal treatment being the same, polyacrylonitrile fibers of greater orientation showed a greater conductivity. The activation energy was found to be independent of the degree of orientation. It may be assumed that the

Card 1/2

ACCESSION NR: AP4009151

electroconductivity increases because of a possible decrease in number of intermolecular barriers and an increase in mobility of current carriers. Orig. art. has: 3 figures.

ASSOCIATION: Institut neftekhimicheskogo sinteza AN SSSR (Institute of Petrochemical Synthesis)

SUBMITTED: 07Aug62 DATE ACQ: 10Feb64 ENCL: 00

SUB CODE: PH NO REF SOV: 003 OTHER: 001

Card 2/2

ACCESSION NR: AP4010763 S/0020/64/154/001/0197/0199

AUTHOR: Drabkin, I. A.; Rozenshteyn, L. D.; Gederikh, M. A.; Davy*dov, B. E.

TITLE: Mechanism of thermal conversion of polyacrylonitrile

SOURCE: AN SSSR. Doklady*, v. 154, no. 1, 1964, 197-199

TOPIC TAGS: polyacrylonitrile, heat treatment, thermal conversion mechanism, absorption spectra, conjugated system, conjugated nitrile structure, semiconductor

ABSTRACT: The absorption spectra of polyacrylonitrile were studied to confirm earlier assumptions (A. V. Topchiyev, M. A. Geyderikh i dr. DAN 128, 512 (1959)) that heat treatment causes formation of conjugation and the development of semiconductor properties. The polyacrylonitrile obtained by oxidation-reduction polymerization having a molecular weight of 270,000 was cast in film form from dimethylformamide. Absorption spectra down to 240 mμ were obtained working

Card 1/2

ACCESSION NR: AP4010763

under 10^{-5} to 10^{-6} mm. Hg. There is no change on heating up to 200C but, on heating to 200-250C, the C ≡ N bond in the IR range disappears simultaneously with formation of the U. V. (350 mμ) band for a conjugated system, with conjugation along the nitriles. In this range increased temperatures only accelerate this reaction. At higher temperatures (300C) another change occurs - a sharp increase in absorption in the 450-600 mμ range with no further change at 350C, possibly indicating consolidation of the conjugated structure. Further work on heat treatment of oriented polyacrylonitrile and on stereoregular polymers is to be done. Orig. art. has: 2 figures and 1 equation

ASSOCIATION: Institut poluprovodnikov Akademii nauk SSSR (Semiconductor Institute, Academy of Sciences SSSR); Institut neftekhimicheskogo sinteza Akademii nauk SSSR (Institute of Petrochemical Synthesis, Academy of Sciences SSSR)

SUBMITTED: 26Jun63 DATE ACQ: 10Feb64 ENCL: 00

SUB CODE: CH, MA NO REF SOV: 003 OTHER: 000

Card 2/2

ACCESSION NR: AP4042795 S/0020/64/157/003/0611/0614

AUTHOR: Davy*dov, B. E.; Korshak, Yu. V.; Krentsel', B. A.

TITLE: Hydrazinolysis — a new method for the study of the structure of nitrogen-containing polymers with conjugated bonds

SOURCE: AN SSSR. Doklady*, v. 157, no. 3, 1964, 611-614

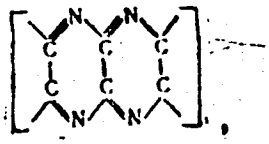
TOPIC TAGS: polyconjugated system, C = N bond, C = C bond, hydrazinolysis, hydrazine hydrate, polymer structure, conjugated bond, polyazine, polyquinoline, polypyridine, paracyanogen, acrylonitrile, polymeric Schiff base

ABSTRACT: Study of the structure of polyconjugated systems with C = N and C = C bonds is difficult, owing to the impossibility of evaluating the C = N:C = C ratio from IR spectra and to the insolubility and infusibility of most compounds of the above systems. For these systems, study methods involving the breaking of polyconjugated bonds and subsequent identification of low-molecular products formed must be applied. Methods which permit a selective breaking of C = N bonds without affecting the C = C bonds in aliphatic and aromatic chains are of special interest. The reaction of "hydrazinolysis,"

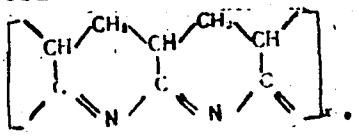
Card 1/3

ACCESSION NR: AP4042795

involving treatment of polymers at 100C with an excess of hydrazine hydrate in argon, has been developed as a method for studying the structure of N-containing polymers with conjugated bonds. This reaction was applied to polyazines, polymeric Schiff's bases, polyquinoline, polypyridine, paracyanogen



and heat-treated acrylonitrile



It was shown that hydrazine is a specific agent which breaks the C = N bonds with the formation of low-molecular products, i.e., fragments of the polymer chain, such as dihydrazones and amines in the case of polyazines and polymers of Schiff's bases. The degree of hydrazinolysis depends on the structure of the initial polymer; the reaction

Card 2/3

ACCESSION NR: AP4042795

proceeds more readily when the polymer is at least partially soluble in the reaction medium. It is concluded that the reaction of hydrazinolysis can be applied as a new method for establishing the structure of polyconjugated systems with C = N bonds.

ASSOCIATION: Institut neftekhimicheskogo sinteza Akademii nauk SSSR (Institute of Petrochemical Synthesis, Academy of Sciences SSSR)

SUBMITTED: 06Feb64 ATD PRESS: 3067 ENCL: 00

SUB CODE: GC, OC NO REF SOV: 006 OTHER: 003

Card 3/3

L 62793-65 EWT(m)/EPF(c)/EPR/EWP(j)/T/EWA(c) Pc-4/Pr-4/Pa-4 WW/JAJ/EM

ACCESSION NR: AP5018457 UR/0064/65/001/007/0676/0680

621.315.592:547

AUTHOR: Davydov, B. E.; Ismailova, G. N.; Nasirov, F. N.; Pirtskhalava, R. N.; Rozenshteyn, L. D.

TITLE: Synthesis of polydiphenyldiacetylenes and their electrical and physical properties

SOURCE: Elektrokhimiya, v. 1, no. 7, 1965, 676-680

TOPIC TAGS: polymerization synthesis, acetylene, thermal stability, catalysis, photoelectric current

ABSTRACT: The article is concerned with the investigation of the properties of thermally polymerized diphenyldiacetylene, having the following structure

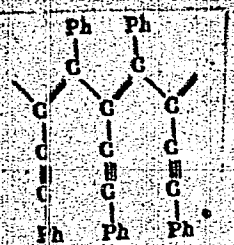
Card 1/5

L 62793-65
ACCESSION NR: AP5018457

The fact that all hydrogen atoms of the main chain are replaced by phenyl groups accounts for its solubility in chloroform, benzene, ether, dioxane, dimethylformamide and for its high thermal stability. It may be heated as high as 500° C without any significant decomposition. The polymer is a nonfusable dark brown substance. When it is deposited from solution on a substrate it forms a relatively strong film. The kinetic polymerization curves at different temperatures are shown in Fig. 1 of the Enclosure. The cryoscopic data indicates that the molecular weight of the polymer is 1100. Experiments with polymer films show that upon interaction with oxygen under the influence of light this polymer does not have a tendency to form inner peroxides. Diphenyldiacetylene was also polymerized catalytically using a complex catalyst, produced during interaction of triethylaluminum and vanadyl acetylacetonate. The polymer obtained was also soluble in benzene, chloroform and other organic solvents. The thermal stability of this polymer was somewhat lower than in the polymers produced by thermal initiation. The lower stability is explained by the presence of the following structures in the chain

Card 2/6

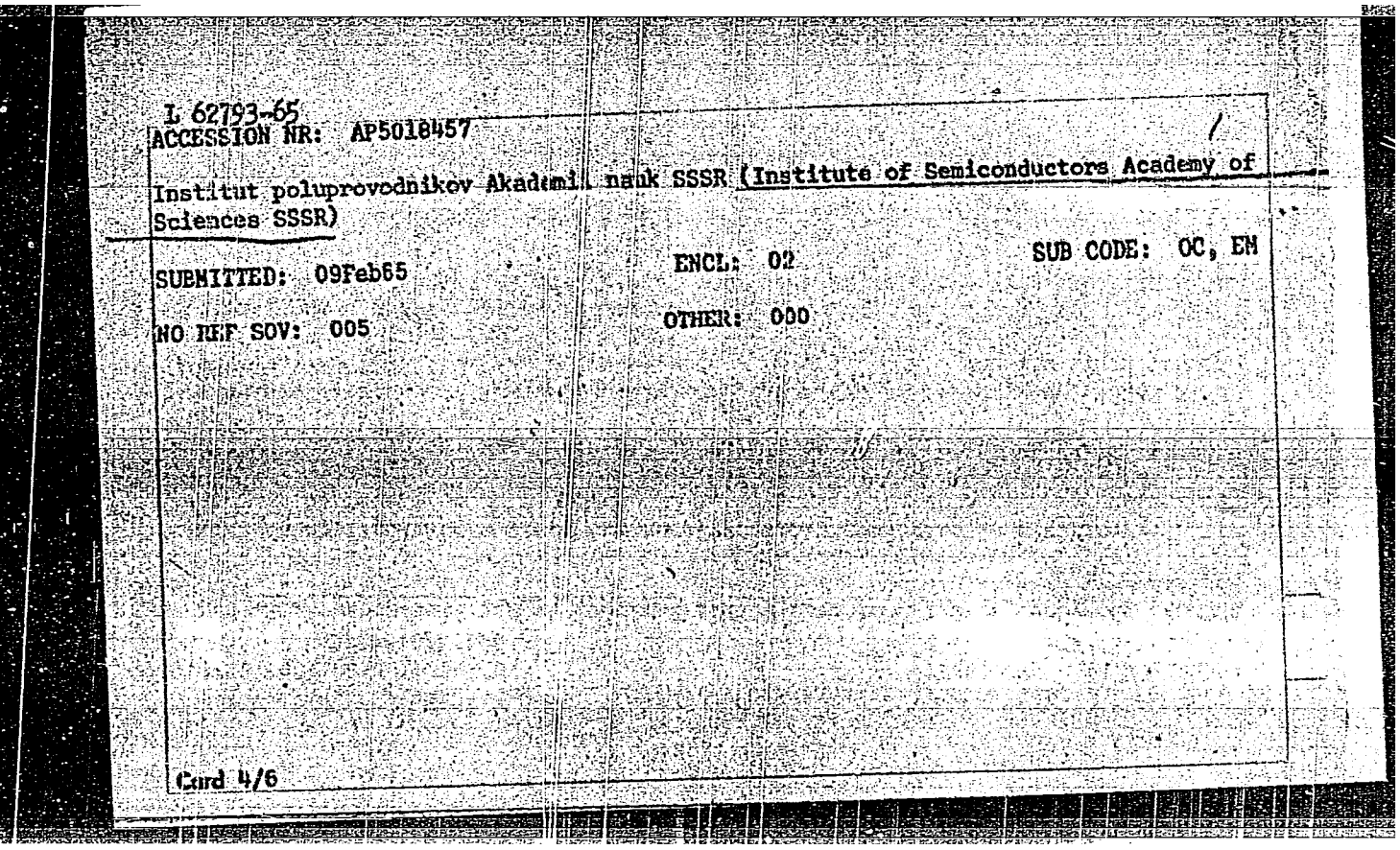
L 62793-65
ACCESSION NR: AP5018457



The photoelectric conductivity of thermal polymers is observed in the region where they absorb light. The spectral dependence of the photoelectric current reduced to the same amount of energy incident on the specimen is in good agreement with the absorption spectrum (Fig. 2 of the Enclosure). Catalytic polymers displayed no photoelectric conductivity. An attempt was made to measure the dark current, but it was possible to record it only when the field strength exceeded $2 \cdot 10^4$ V/cm. Orig. art. has: 5 figures.

ASSOCIATION: Institut neftekhimicheskogo sinteza Akademii nauk SSSR (Petrochemical Synthesis Institute Academy of Sciences SSSR)

Card 3/6



L 62793-65
ACCESSION NR: AP5018457

Institut poluprovodnikov Akademii nauk SSSR (Institute of Semiconductors Academy of Sciences SSSR)

SUBMITTED: 09Feb65 ENCL: 02 SUB CODE: OC, EM

NO REF SOV: 005 OTHER: 000

Card 4/6

L 62793-65
ACCESSION NR: AP5018457

ENCLOSURE: 01

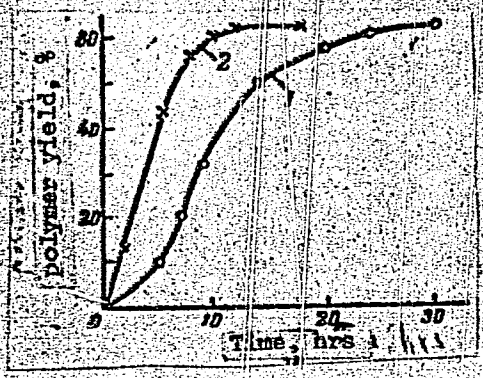


Fig. 1. Kinetic curves for thermal polymerization of diphenyldiacetylene at 106° C (1) and 133° C (2)

Card 5/6

L 62793-65

ACCESSION NR: AP5018457

ENCLOSURE: 02

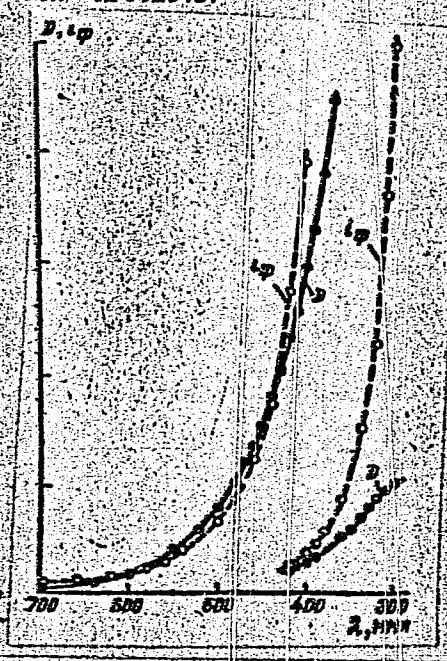


Fig. 2. Spectral absorption curves and photoelectric current per unit incident energy, of polydiphenylacetylene, heated at 150° C for 3 hrs 45 min. The curves on the right are given on smaller scale.

Card 6/6

L 48978-65 EWG(j)/EWT(m)EPF(c)/EPF(n)-2/EWP(j)/T/EWA(h)/EWA(l) Pc-4/Pr-4/Peb/Pu-4
GG/RM

ACCESSION NR: AP5009661 UR/0062/65/000/003/0520/0525

AUTHOR: Khutareva, G. V., Shishkina, M. V., Davydov, B. E.

TITLE: Polymerization of salts of propiolic acid

SOURCE: AN SSSR. Izvestiya. Seriya khimicheskaya, no. 3, 1965, 520-525

TOPIC TAGS: propiolic acid polymer, unsaturated carboxyl acid, acetylene polymerization, metal polypropiolate, radiation polymerization

ABSTRACT: The authors studied the solid-phase radiation-induced polymerization of certain salts of propiolic acids formed by univalent and divalent metals. The polymerization of propiolates formed by ammonia, hydrazine, butylamine, and dicyclohexylamine was also carried out. X-ray structural analysis revealed that in all cases, the polymerization was accompanied by a breakdown of the crystal lattice of the monomer. Hence, the tendency of the various salts toward polymerization depends on the stability of this lattice, the stability in turn being determined by the radius and valence of the cation. As a rule, the total yield of the polymer was substantially higher in the polymerization of propiolates of divalent metals than in the case of univalent metals. The barium and cadmium salts polymerized almost quantitatively at suitable integral doses. Polymerization induced by gamma rays is accompanied by radiolysis, the amount of radiolysis products being no

Card 1/3

ACCESSION NR: AP5009651

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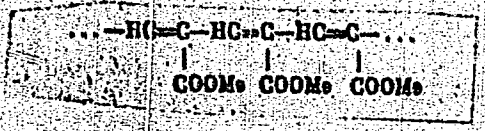
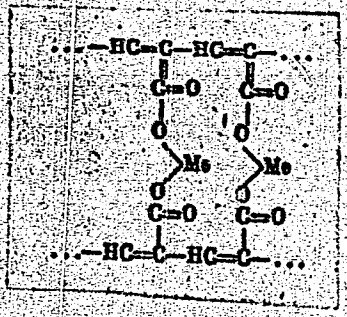
higher than 1 to 1.5%. The following structures for the polypropiolates of univalent metals (I) and divalent metals (II) were proposed:



(1)

and



(2)

L 48978-65

ACCESSION NR: AP5009661

Orig. art. has: 4 figures, 3 tables, and 2 formulas.

ASSOCIATION: Institut neftekhimicheskogo sinteza im. A. V. Topchiyeva Akademii nauk SSSR (Institute of Petrochemical Synthesis, Academy of Sciences, SSSR)

SUBMITTED: 12Jun64 ENCL: 00 SUB CODE: OC , GC

NO REF SOV: 001 OTHER: 001

Card 3/3

VASILENOK, Yu.I.; DAVYDOV, B.E.; KRENTSEL', B.A.; SAZHIN, B.I.

Donor-acceptor interaction of halogens with polystyrene, polyvinyltoluene, and copolymers of styrene with α-methylstyrene and β-vinylnaphthalene. Vysokom. soed. 7 no.4: 626-633 Ap '65. (MIRA 18:6)

1. Gosudarstvennyy nauchno-issledovatel'skiy institut polimerizatsionnykh plastmass.

GEYDERIKH, M.A.; DAVYDOV, B.E.; KRENTSEL', B.A.

Thermal conversion of polyacrylonitrile. Izv. AN SSSR. Ser. khim. no.4:636-643 '65. (MIRA 18:5)

1. Institut neftekhimicheskogo sinteza im. A.V.Topchiyeva AN SSSR.

L 50548-65 EWT(1)/EPA(s)-2/EWT(m)/EPF(c)/EWP(j)/T/EWA(h) Pz-6/Pr-4/Pr-4/
Pt-7/Pab IJP(c) AT/RM
ACCESSION NR: AP5013057 UR/0190/65/007/005/0835/0842

48
47
B

AUTHOR: Popov, Yu. A.; Davydov, B. E.; Kubasova, N. A.; Krentsel', B. A.; Konstantinov, I. I.

TITLE: Synthesis and properties of polymeric Schiff bases

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 7, no. 5, 1965, 835-842

TOPIC TAGS: organic semiconductor, semiconducting polymer, polymeric Schiff base, electrical property

ABSTRACT: Ten new polymeric Schiff bases have been synthesized and their chemical structure, morphology, and principal properties have been studied (see Table 1 of the Enclosure). The synthesis involved the polycondensation of p-phenylenediamine or 2,6-diaminopyridine with various dicarboxylic compounds in glacial acetic acid under mild conditions which substantially prevented side reactions. The polymers were yellow to black materials, in some cases infusible up to 400C, showing high-ohmic semiconductor properties. For the polymeric Schiff bases which are continuously conjugated, the activation energy for conduction was 1.7—2.6 ev, and for those in which conjugation was disrupted by hetero atoms and $-CH_2-$ groups, this energy was 3.1—3.6 ev. Pyrolysis of the polymers at 150—500C under vacuum was

Card 1/4

L 50548-65
ACCESSION NR: AP5013057

studied and hypotheses as to the chemical reactions causing changes in electrical properties (tabulated in the source) were advanced. In the 400—500C range, these changes were attributed to molecular rearrangement to form three-dimensional conjugated systems. EPR spectroscopy showed that all the polymers gave a narrow signal (7×10^{14}—1×10^{18} spin/g). A substantial effect of oxygen adsorption on electrical properties was demonstrated, usually consisting in a drop in electrical conductivity and a rise in activation energy. Orig. art. has: 2 figures, 2 tables, and 1 formula. [SM]

ASSOCIATION: Institut neftekhimicheskogo sinteza, AN SSSR (Institute of Petrochemical Synthesis, AN SSSR)

SUBMITTED: 01Jul64 ENCL: 02 SUB CODE: GC

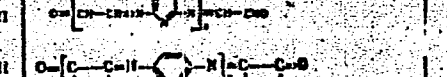
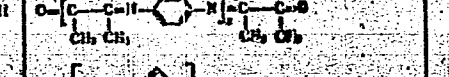
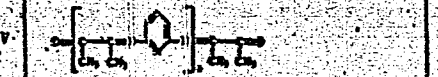
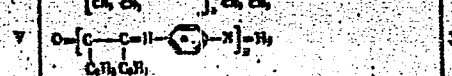
NO REF SOV: 007 OTHER: 003 ATD PRESS: 4007

Card 2/4

L 50548-65
ACCESSION NR: AP5013057

ENCLOSURE: 01

Table 1. Some properties of polymeric Schiff bases

	Formula	Color	Yield, %	Mol. wt. of polymer	Mol. wt. from osmometry	Mol. wt. by ebullioscopic	Crystallizing	ΔE, ev	σ, ohm⁻¹ cm⁻¹	EPR signal, spin/g
I		dark brown	43,00	3	320	—	amorphous	2,0	$7,5 \cdot 10^{-11}$	$3 \cdot 10^{17}$
II		same	38,00	3	440	800	same	2,1	$3,7 \cdot 10^{-11}$	$1,8 \cdot 10^{18}$
III		" "	57,00	4	700	1200	" "	2,0	$2,9 \cdot 10^{-12}$	$1,4 \cdot 10^{18}$
IV		grey	84,00	5	900	1500	" "	2,3	$1,3 \cdot 10^{-12}$	$1,7 \cdot 10^{18}$
V		yellow	38,00	3	1105	1100	crystalline m.p. 222—223°C	2,3	$1,2 \cdot 10^{-12}$	$2,1 \cdot 10^{18}$
VI		same	33,00	3	960	900	crystalline	2,0	$8 \cdot 10^{-13}$	$1,5 \cdot 10^{18}$
VII		dark brown	88,00	3	450	—	amorphous	1,7	$5,8 \cdot 10^{-12}$	$1,4 \cdot 10^{18}$

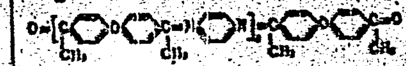
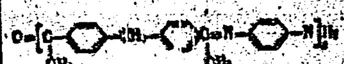
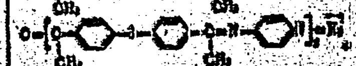
Card 3/4

L 50548-65

ACCESSION NR: AP5013057

ENCLOSURE: 02

Table 1. Some properties of polymeric Schiff bases (Cont.)

	Formula	Color	Yield, %	Degree of polycondensation, n	Mol. wt. from end group determination	Mol. wt. by ebullioscopic method	Crystallizing	ΔE, ev	σ, ohm^{-1} cm^{-1}	EPR signal, spin/g
VIII		black	33,0[illegible]	6	1180	1100	same	1,7	1,8·10^{-13}	1·10^{19}
IX		yellow	43,9[illegible]	3	830	—	crystalline	2,4	7,0·10^{-13}	1,6·10^{18}
X		same	30,5[illegible]	3	880	—	amorphous	2,1	1,0·10^{-13}	3,7·10^{18}
XI		violet	20,2[illegible]	2	1120	1100	crystalline, m.p. 185—183°C	2,8	1,3·10^{-9}	1,2·10^{19}
XII		gray	19,3[illegible]	2	[illegible]	770	same, m.p. 133—137°C	2,8	2,8·10^{-9}	2,4·10^{18}
XIII		brown	20,3[illegible]	11	4100	4700	amorphous	3,1	1,3·10^{-9}	7·10^{18}

Card 4/4

L 29134-65 EPA(s)-2/EWT(m)/EPF(c)/EWP(j)/T Pc-4/Pr-4/Pt-10 RM

ACCESSION NR: AP5005899 S/0020/65/160/003/0650/0653

AUTHOR: Davydov, B. E.; Zakharyan, R. Z.; Karpacheva, G. P.; Krentsel', B. A.; Lapitskiy, G. A.; Khutareva, G. V.

TITLE: Impairment of coplanarity and conjugation in crystallizing polymers

SOURCE: AN SSSR. Doklady, v. 160, no. 3, 1965, 650-653

TOPIC TAGS: crystallization, conjugation, conjugated polymer, organic semiconductor, semiconducting polymer, coplanarity

ABSTRACT: A study has been made to determine to what extent crystallization gives rise to conjugation disruption due to impairment of coplanarity in conjugated polymers in the solid phase, and how it affects their optical, paramagnetic, and semiconducting properties. These properties were compared for 32 polyazines and polymeric Schiff bases. It was found that the properties which are typical of conjugated polymers are exhibited to a greater extent by amorphous than by crystalline polymers. Thus, in color, in IR spectra, and in the absence of EPR, crystalline polyazines are similar to their analogs containing O, S, CH_3, or OCH_3 groups between conjugated segments in the backbone. A similar correlation, but less marked, was in evidence for the polymeric Schiff bases. This effect of crystallinity on con-

Card 1/2

L 29134-65

ACCESSION NR: AP5005899

jugated-polymer properties was attributed to the impairment of coplanarity during crystallization. In thermal stability and activation energy for conduction, however, the crystalline polymers were closer to the amorphous ones. The effect of crystallinity on semiconducting properties was interpreted as being determined in each individual case by changes in activation energy due to two competing processes occurring on crystallization: an increase in carrier mobility and a decrease in carrier concentration. Orig. art. has: 1 table. [SM]

ASSOCIATION: Institut neftekhimicheskogo sinteza imeni A. V. Topchiyeva Akademii nauk SSSR (Institute of Petrochemical Synthesis, Academy of Sciences, SSSR)

SUBMITTED: 30Jun64 ENCL: 00 SUB CODE: GC, OC

NO REF SOV: 000 OTHER: 000 ATD PRESS: 3197

Card 2/2

L 38563-65 EWT(m)/EPF(c)/EPR/EWP(j)/T/EWA(c) Pc-4/Pr-4/Ps-4/Pi-4 RPL
RWH/WW/RM

ACCESSION NR: AP5010171 UR/0020/65/161/002/0399/0402

AUTHOR: Khutareva, G. V.; Brin, G. P.; Davydov, B. E.; Krentsel', B. A.; Krasnovskiy, A. A. (Corresponding member AN SSSR)

TITLE: Photosensitizing properties of polyconjugated organic polymers

SOURCE: AN SSSR. Doklady, v. 161, no. 2, 1965, 399-402

TOPIC TAGS: photosensitization, conjugated double bond system, polyconjugated polymer, ascorbic acid, oxidation, polyacronitrile, Schiff's base, polynitrile, polyquinoline

ABSTRACT: This study investigates the photosensitizing effect of polymers with a system of conjugated double bonds on the oxidation of ascorbic acid. The study was prompted by the fact that photosensitization was established for some crystalline organic dyes and phthalocyanines (semiconducting substances with conjugated bonds). The Warburg-Barcroft micromanometric method was applied to trace the kinetics of the reaction. The reaction was conducted in aqueous ascorbic acid solution in the presence of finely powdered polymers under red light (wavelength more than 600 mμ), white light of an incandescent bulb, or UV light (mercury 365-mμ band). The following polymers were used: thermally treated polyacronitrile, heat-polymerized

Card 1/3